Recent Advancements in Multidisciplinary Analysis

Greg Moore, Mike Chainyk, and John Schiermeier
(Email: Greg.Moore@jpl.nasa.gov)
Jet Propulsion Laboratory, Pasadena, California

Accurately predicting optical system performance for any of the large aperture scenarios that are currently envisioned is a uniquely challenging task, and one that has served to highlight a number of areas of necessary advancement in the field of computer-aided engineering analysis. The strongly coupled nature of these classes of problems, combined with unprecedented levels of required optical precision, demand a solution approach that is itself fundamentally integrated if accurate efficient analyses, capable of pointing the way toward improved designs, are to be achieved. Recent advancements in this area have picked up on the spirit of the original JPL-developed IMOS code (Integrated Modeling of Optical Systems), and have served to lay the groundwork for an entirely new analytical capability; one that is open, highly extensible, is hosted from within Matlab, yet is based on core high-performance computational modules written in C, and natively understands Nastran analysis model descriptions. Capabilities currently under development, a few of which will be highlighted here, will soon capture behavioral aspects of coupled nonlinear radiative heat transfer, structures, and optics problems to a level of accuracy and performance not yet achieved for these classes of problems, in an environment that will greatly facilitate future research, development, and technical oversight efforts.

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